

Application No. 10/536,713
Paper Dated: January 31, 2011
In Reply to USPTO Correspondence of September 30, 2010
Attorney Docket No. 0470-051644

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1-46. (Canceled)

47. (Withdrawn) A method for improving the functional properties of globular proteins, comprising the steps of:

- a) providing a solution of one or more globular proteins, in which solution the protein is at least partially aggregated in fibrils; and
- b) performing one or more of the following steps in random order:
 - i) adjusting the pH of the solution to about neutral;
 - ii) increasing the salt concentration in the solution;
 - iii) concentrating the solution;
 - iv) changing the solvent quality of the solution.

48. (Withdrawn) The method according to claim 47, wherein the fibril-containing solution of the one or more globular proteins is provided by heating a solution of the one or more proteins above room temperature, preferably at a temperature between about 50 and 100° C at a pH between about 0.5 and 4.

49. (Withdrawn) The method according to claim 48, wherein the fibril-containing solution of the one or more globular proteins is provided by heating a solution of the one or more proteins above room temperature, preferably at a temperature between about 50 and 100° C at a pH between about 0.5 and 3.

50. (Withdrawn) The method according to claim 48, wherein the solution is heated during a period of at least 10 minutes.

51. (Withdrawn) The method according to claim 48, wherein the solution is heated during a period of at least one hour.

52. (Withdrawn) The method according to claim 48, wherein the solution is heated during a period of at least 6 hours.

53. (Withdrawn) The method according to claim 48, wherein the solution is heated during a period of at least 8 hours.

54. (Withdrawn) The method according to claim 47, wherein the solution is cooled before performing one or more of steps i) to iv).

55. (Withdrawn) The method according to claim 54, wherein the solution is cooled to a temperature between denaturation temperature and 20° C.

56. (Withdrawn) The method according to claim 54, wherein the solution is cooled to a temperature between denaturation temperature and 5° C.

57. (Withdrawn) The method according to claim 48, wherein the heating is performed at a pH below 2.8, preferably below 2.5, more preferably below 2.2.

58. (Withdrawn) The method according to claim 47, wherein the fibril-containing solution of the one or more globular proteins is provided by adding a denaturing agent to the solution.

59. (Withdrawn) The method according to claim 58, wherein the denaturing agent is a hydrotropic or chaotropic agent.

60. (Withdrawn) The method according to claim 58, wherein the denaturing agent is selected from the group consisting of ureum, guanidinium chloride and alcohols, such as methanol, ethanol, propanol, butanol and trifluorethanol.

61. (Withdrawn) The method according to claim 50, wherein the solution has a pH of 0.5-14.

62. (Withdrawn) The method according to claim 48, wherein the globular protein is a protein that is substantially non-denatured and is capable of being thermally denatured at a temperature at or above the denaturation temperature of the protein or capable of being chemically denatured.

63. (Withdrawn) The method according to claim 48, further comprising the step of adding already formed fibrils to the solution prior to production of the fibril-containing solution.

64. (Withdrawn) The method according to claim 63, wherein the already formed fibrils are obtainable by the method according to claim 48.

65. (Withdrawn) The method according to claim 63, wherein the amount of already formed fibrils based on the total amount of protein is more than 0 and less than 90%.

66. (Withdrawn) The method according to claim 63, wherein the amount of already formed fibrils based on the total amount of protein is between 10 and 80%.

67. (Withdrawn) The method according to claim 63, wherein the amount of already formed fibrils based on the total amount of protein is between 20 and 70%.

68. (Withdrawn) The method according to claim 63, wherein the amount of

already formed fibrils based on the total amount of protein is between 30 and 60%.

69. (Withdrawn) The method according to claim 47, wherein the pH is increased to a value between 3.9 and 9.

70. (Withdrawn) The method according to claim 47, wherein the pH is increased to a value about neutral pH.

71. (Withdrawn) The method according to claim 47, wherein the salt concentration is increased to a maximum of 0.2M.

72. (Withdrawn) The method according to claim 47, wherein the salt concentration is increased to a maximum of 0.1M.

73. (Withdrawn) The method according to claim 72, wherein the salt used for increasing the salt concentration is the salt of a divalent ion, preferably calcium.

74. (Withdrawn) The method according to claim 72, wherein the salt used for increasing the salt concentration is the salt of calcium.

75. (Withdrawn) The method according to claim 47, wherein step i) is performed prior to step ii).

76. (Withdrawn) The method according to claim 47, wherein the solvent quality of the solution is changed by removing the denaturing agent.

77. (Withdrawn) The method according to claim 47, further comprising the step of drying the solution to obtain a dry product.

78. (Withdrawn) The method according to claim 77, wherein the drying comprises spray drying.

79. (Withdrawn) The method according to claim 77, wherein the dry product is a powder.

80. (Withdrawn) The method according to claim 47, wherein the globular protein is selected from the group consisting of whey and proteins, egg albumins, blood globulins, soy proteins and wheat proteins.

81. (Withdrawn) The method according to claim 47, wherein the globular protein is selected from the group consisting of prolamines, potato proteins and pea proteins.

82. (Withdrawn) The method according to claim 80, wherein the globular protein is a whey protein isolate or a whey protein concentrate.

83. (Withdrawn) The method according to claim 80, wherein the globular protein is a whey protein concentrate enriched in β -lactoglobulin.

84. (Withdrawn) The method according to claim 83, wherein the globular protein is the whey protein isolate BiproTM.

85. (Withdrawn) The method according to claim 83, wherein the globular protein is β -lactoglobulin.

86. (Currently Amended) A protein additive based on a system of one or more proteins that are at least partially aggregated in fibrils, wherein the protein additive has improved functional properties as compared to a similar protein additive based on a system of the same one or more proteins in the same concentration in which the proteins are not aggregated in fibrils,

wherein said protein additive is formed by:

- a) providing a solution of one or more globular proteins, in which solution the protein is at least partially denatured and at least partially aggregated in fibrils; and
- b) performing one or more of the following steps in random order:
 - i) adjusting the pH of the solution to about neutral;
 - ii) increasing the salt concentration in the solution;
 - iii) concentrating the solution;
 - iv) changing the solvent quality of the solution.

87. (Previously Presented) The protein additive according to claim 86, wherein the functional properties are one or more of the following: foaming properties, thickening properties, gelling properties and emulsifying properties.

88. (Previously Presented) The protein additive obtainable by the method according to claim 47.

89. (Previously Presented) The protein additive according to claim 86, wherein the protein additive is in dry form.

90. (Withdrawn) The protein additive according to claim 86 for use as a stabilizer of foams, dispersions and emulsions.

91. (Previously Presented) The protein additive according to claim 86 for use in dairy products.

92. (Previously Presented) The protein additive according to claim 86 for use in meat products.

93. (Withdrawn) The protein additive according to claim 86 for use in paints.

94. (Withdrawn) The protein additive according to claim 86 for use in toothpastes, cosmetics, deodorants.

95. (Previously Presented) A dairy product comprising the protein additive according to claim 86.

96. (Previously Presented) A meat product comprising the protein additive according to claim 86.

97. (Withdrawn) A paint comprising the protein additive according to claim 86.

98. (Withdrawn) A toothpaste comprising the protein additive according to claim 86.

99. (Withdrawn) A cosmetic comprising the protein additive according to claim 86.

100. (Withdrawn) A deodorant comprising the protein additive according to claim 86.

101. (Withdrawn) A protein composition comprising one or more particles having texturizing properties, wherein the protein molecules are aggregated into fibrils.

102. (Withdrawn) The protein composition according to claim 101, wherein the texturizing properties comprise the ability to promote or modify the viscosity or gelling ability of a product containing the composition.

103. (Withdrawn) The protein composition according to claim 101, wherein the fibrils have an aspect ratio defined as the ratio between length and width or length and height or length and diameter of 5 or higher.

104. (Withdrawn) The protein composition according to claim 101, wherein the length of the fibrils is preferably equal to or about 100 Å and equal to or below 1 µm, preferably below 100 µm.

105. (Withdrawn) The protein composition according to claim 104, wherein the length of the fibrils is preferably equal to or above 100 Å and below 100 µm.

106. (New) The protein additive according to claim 86, wherein the globular proteins are denatured by:

- i) heating the solution to a temperature between 50° C and 100° C at a pH between 0.5 and 4, or
- ii) adding a denaturing agent.

107. (New) The protein additive according to claim 106, wherein the globular proteins are denatured by heating, and wherein the solution is heated for at least 1 hour.

108. (New) The protein additive according to claim 106, wherein the globular proteins are denatured by heating, and wherein the solution is heated for at least 8 hours.

109. (New) The protein additive according to claim 106, wherein the globular proteins are denatured by heating, and wherein the pH is between 0.4 and 2.8.

110. (New) The protein additive according to claim 106, wherein the globular proteins are denatured by heating, and wherein the pH is between 0.4 and 2.2.

Application No. 10/536,713
Paper Dated: January 31, 2011
In Reply to USPTO Correspondence of September 30, 2010
Attorney Docket No. 0470-051644

111. (New) The protein additive according to claim 106, wherein the globular proteins are denatured by adding the denaturing agent, and wherein the denaturing agent is selected from the group consisting of ureum, guanidinium chloride and alcohols, such as methanol, ethanol, propanol, butanol and trifluorethanol.